

## ASPECTS OF TREATMENT\*

# The transmaxillary K-wire

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### Summary

*The transmaxillary K-wire is a simple, fast, safe, and effective technique for the fixation of unstable fractured malar bones. Combined with other techniques such as interdental fixation it simplifies and provides the fixation of the Le Fort II fracture or osteotomy and certain osteotomies used for facial advancement. The technique of insertion is described and illustrated.*

### Introduction

The unstable facial fracture is a recurring problem. Methods of fixation principally involve internal wiring or the use of external appliances to provide a firm structure to which unstable fragments may be fixed.

There is no doubt that external fixation is effective, but it has serious disadvantages. It requires complicated equipment, takes time and experience to apply, and is cumbersome for the patient, who also finds it an embarrassment. Internal wiring has the disadvantage that it does not prevent backward displacement of the maxillary complex in the Le Fort II and III fractures. It also does not provide three-point fixation for mobile malar (tripod) fractures as it is usually only possible to wire it at the zygomaticofrontal and zygomaticomaxillary fracture sites.

The transmaxillary Kirshner wire (K-wire) solves these problems by utilising one or two intact malar bones to provide stability.

### History

The use of the K-wire was first suggested in 1942 by Brown and McDowell<sup>1</sup>, who employed it for mandibular fractures. In 1950 Fryer<sup>2</sup>

first reported its use in stabilising the fractured zygoma. This was extended by Brown and McDowell who, with Fryer, reported its use in major fractures of the middle third of the face in 1952<sup>3</sup>, and subsequently a 21-year review<sup>4</sup> showed this method to be reliable, safe, and effective.

There are, however, no references to this use of the K-wire in the British literature and the method is seldom used in Great Britain.

### Application

1) The malar (tripod) fracture (Fig. 1) often remains unstable with internal wiring or other devices such as antral packs which do not achieve solid three-point fixation.

The transmaxillary K-wire inserted from the intact side traverses the intact malar bone, maxillary antrum, medial wall of the antrum, nasal septum, and the medial wall and cavity of the antrum of the fractured side before impaling the unstable malar bone. The K-wire is therefore supported by four stable, solid structures before it fixes the unstable malar bone.

2) The Le Fort II fracture and osteotomy (Fig. 2) is prevented from any posterior or inferior displacement by the transmaxillary K-wire, which utilises the two intact bones to fix the mobile fragment, which it holds precisely by passing through the medial wall of the antrum on both sides and the nasal septum. Interdental fixation prevents any tendency to rotate about the axis of the K-wire.

3) The osteotomy used in facial advancement, with the step-cut in the zygoma (Fig. 3) is also solidly fixed by the transmaxillary K-wire, which utilises the two solid zygomatic complexes to fix the mobile fragment and prevent posterior displacement.

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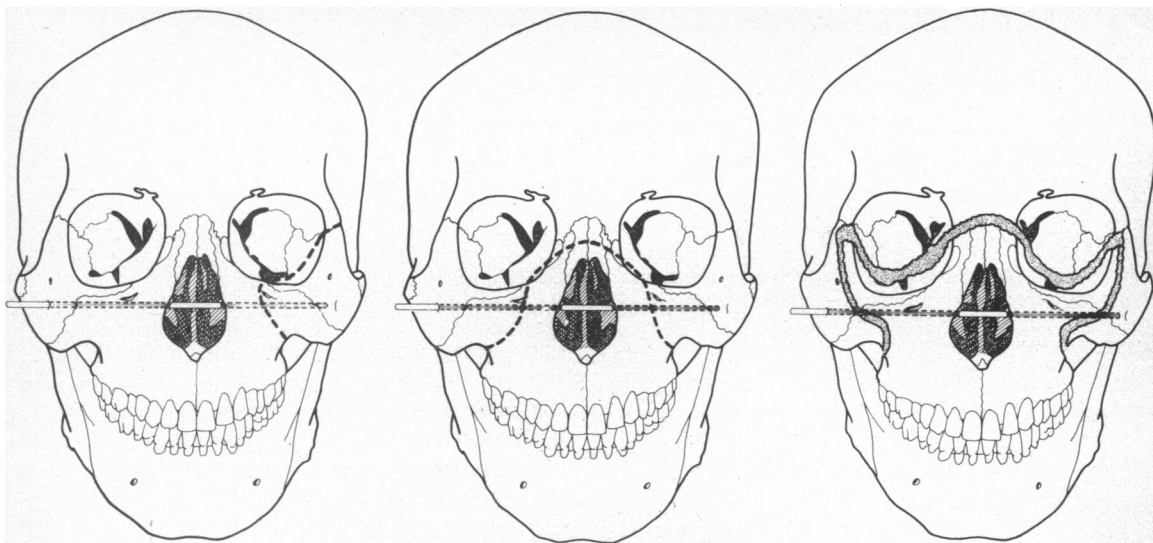


FIG. 1 (left) *K-wire in situ stabilising a fractured left malar bone.* FIG. 2 (centre) *K-wire in situ stabilising a Le Fort II fracture or osteotomy.* FIG. 3 (right) *K-wire in situ stabilising an osteotomy often used in facial advancement.*

### Operative technique

Under general anesthesia and after reduction has been achieved by any suitable method the low point of the body of the malar bone is palpated on the intact side. With a hand drill the K-wire is then drilled directly through the skin 0.5 cm from the edge of the lower extremity of the malar bone. No skin incision is made. With an assistant steadying the patient's head the K-wire is drilled directly through the malar bone in a horizontal direction. The wire can be felt to pass through the

medial wall of the antrum, the nasal septum, and the medial wall of the antrum on the other side and to enter the opposite malar bone 0.5 cm from the lower border. When the point of the K-wire can be palpated beneath the skin on the opposite side drilling is stopped. The K-wire is left protruding through the skin on the intact side and protected with a cork stopper (Figs 4 and 5).

In about 4 weeks' time, when the fracture has healed, the K-wire can be easily pulled out with a strong haemostat. The removal is not painful and requires no local anesthesia (Fig. 6).

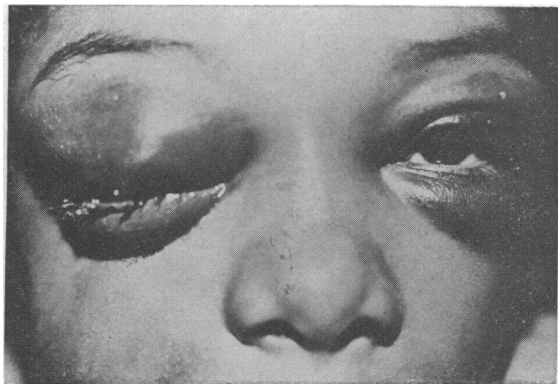


FIG. 4 *Patient with a fracture-dislocation of the zygoma on the right.*

### Discussion

The advantages of the transmaxillary K-wire are that it requires a minimum of specialised equipment, takes less than 2 min, and leaves virtually no scar. It fixes the unstable fragment solidly in its new position and has the considerable advantage that it can fix the unstable fragment spatially. For instance, in situations in which there is a severely comminuted fracture of the infraorbital rim, maybe with some actual bone loss, the transmaxillary K-wire will allow the floating malar bone to be fixed solidly in its natural position, perhaps



FIG. 5 *Happy patient with K-wire in position and protruding from the intact side.*

while the infraorbital rim is bone-grafted, making a difficult wiring of the infraorbital rim unnecessary.

The transmaxillary K-wire is quite compatible with other forms of fixation such as interdental wiring, and it is quite possible, and



FIG. 6 *Postoperative appearance.*

frequently desirable, to visualise the reduction of the fracture openly.

The small pin protruding from the cheek is the only external evidence of this fixation technique, is much less obvious than the external appliances, and is much more comfortable.

In a combined experience of more than 100 cases we have seen no bone infections from this technique. During insertion care must be taken to avoid the orbit. Oral intubation is desirable because the K-wire may impale the nasal tube.

### References

- 1 Brown, J B, and McDowell, F (1942) *Surgery, Gynecology and Obstetrics*, 74, 227.
- 2 Fryer, M P (1950) *Surgical Clinics of North America*, 30, 1361.
- 3 Brown, J B, Fryer, M P, and McDowell, F (1952) *Plastic and Reconstructive Surgery*, 9, 276.
- 4 Fryer, M P, Brown, J B, and Davis, G (1969) *Plastic and Reconstructive Surgery*, 44, 576.